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XXXIII.—*Additional Notes on some Type Specimens of Cretaceous Fishes from Mount Lebanon in the Edinburgh Museum of Science and Art.* By A. Smith Woodward, F.L.S.

Since the publication of a series of notes on some type specimens of Cretaceous fishes in the Edinburgh Museum last November (Ann. & Mag. Nat. Hist. ser. 7, vol. ii. pp. 405–414) Dr. Traquair has kindly lent me the remaining specimens, which seem to need further examination and description. To these the following notes relate.

1. *Pseudoberyx longispina*, J. W. Davis, Trans. Roy. Dublin Soc. [2] vol. iii. (1887), p. 511, pl. xxv. fig. 2. [=*Nematonotus Bottæ*, Pict. & Humb., sp.]

The so-called "unique specimen" described as the type of *Pseudoberyx longispina* is distorted in the abdominal region, as indicated by the position of the dorsal and pelvic fins with reference to the margin of the squamation. The length of the head with opercular apparatus seems to have been approximately equal to the maximum depth of the trunk and contained twice in the length from the pectoral arch to the base of the caudal fin. The head is remarkably short and deep, and a rod-shaped fragment in the position of the upper jaw might be part of a Scopeloid or Acanthopterygian premaxilla. Allowing for those hidden by the opercular apparatus, there must have been about thirty vertebræ, and at least sixteen of

these are clearly caudal, with robust, gently arched neural and hæmal spines; as noted by Davis, there is a much-expanded hypural bone. The remains of the paired fins prove them to have been very small, and the pelvic pair must have been opposed to the anterior part of the dorsal fin. The latter is situated completely within the anterior half of the trunk, and seems to be borne by twelve supports. Its two foremost rays are comparatively small and short; the third is excessively elongated, as shown in Davis's figure, articulated in its distal two thirds, but not subdivided; the following rays, which are shorter and both divided and articulated distally, rapidly decrease in length. Behind the fin Davis recognizes "a number of fin-rays extending some distance towards the tail"—a deceptive appearance due to the crushing of the imperfectly preserved scales. The anal fin is very small, probably with not more than seven or eight short rays, and separated from the caudal fin by a space about equal to the length of its own base-line. The inequality in length of the lobes of the caudal fin noted by Davis is evidently due to accidental distortion in the fossil. The scales are rather large and quite smooth, and appear to me to be cycloid, without any trace of serrations.

If this fossil be carefully compared with the specimens from Hakel in the British Museum, rightly labelled "*Clupea Bottæ*, Pictet & Humbert," by the late William Davies, it will be found to agree in every essential particular. Although Pictet and Humbert failed to discover the extreme elongation of the third dorsal fin-ray, this character is distinctly shown in some of the specimens just mentioned. The fish, however, does not belong to the genus *Clupea*, as indicated by the absence of ventral ridge-scutes, while it is excluded even from the family Clupeidæ by the structure of the upper jaw. The specimens in the British Museum prove that the rod-like premaxilla forms the complete upper margin of the mouth, excluding the equally slender maxilla. *Clupea Bottæ*, with which *Pseudoberyx longispina* is included, may thus be regarded as the type of a new genus of Scopelidæ, Nematonotus, defined as follows:—Trunk short and robust, and maximum depth at origin of dorsal fin. Mandibular suspensorium nearly vertical; jaws delicate and teeth minute. Vertebræ about 30 in number, half being caudal; ribs moderately robust. Paired fins very small, the pelvic pair opposed to the dorsal, which is situated completely within the anterior half of the back, short-based and much elevated, with at least one ray excessively elongated; anal fin relatively small and remote; caudal fin stout but deeply forked.

Scales large and uniform, moderately thick, smooth and not serrated.

2. *Homonotus pulcher*, J. W. Davis, *loc. cit.* p. 519, pl. xxv. fig. 3. [=*Pycnosterinx Russeggeri*, Heck.]

Careful comparison proves that the type specimen of this so-called new species is a small distorted example of *Pycnosterinx dorsalis*, Pictet, which is doubtless to be identified with the original *P. Russeggeri* of Heckel.

3. *Exocœtoides minor*, J. W. Davis, *loc. cit.* p. 551, pl. xxvi. fig. 5.

The more imperfect of the two type specimens of *Exocœtoides minor*, now in the Edinburgh Museum, is evidently that described in the text. The interorbital and rostral portions of the cranium are shown to be narrow and compressed, while the quadrate articulation is distinct on each side, proving the gape of the mouth to be small, not extending backwards beyond the anterior margin of the orbit. The structure of the upper jaw is not clear. The number of vertebræ is not easily ascertained, but seems to be between 30 and 40; and there are traces of the stout transverse processes bearing the slender ribs. Remains of the clavicles prove these bones to be large and robust, but the abnormal arrangement here described by Davis is not traceable. The paired fins are described by Davis, but he has omitted to observe a trace of the dorsal between the pelvic pair. His so-called dorsal near the end of the tail is the comparatively small anal fin.

The second specimen figured by Davis (*loc. cit.* pl. xxvi. fig. 1), and only briefly noticed by him, is in the British Museum (no. P. 4756). This shows the dorsal fin, with about 7 rays, above or immediately in front of the pelvic pair, while the anal is comparatively small and remote, as in the first specimen now described.

4. *Lewisia ovalis*, J. W. Davis, *loc. cit.* p. 593, pl. xxxiii. fig. 6. [=*Spaniodon brevis*, Pict. & Humb.]

In his description of the head of this fish Davis does not make sufficient allowance for imperfections and the result of crushing. It exhibits a very stout apparently toothless premaxilla, and the articulation of the mandible is clearly below the hinder border of the orbit. Remains of the right mandibular ramus bear a very large erect lanceolate tooth near

the symphysial end, and the lower portion of the left mandibular ramus (described as "a narrow bone" by Davis) is shown from within. Except the large laniary just mentioned, the remains comprise no traces of teeth. The head, indeed, has precisely the aspect of that of *Spaniodon*, which is characterized by a single pair of enlarged teeth near the symphysis of the mandible. If the trunk and fins be carefully compared with *Spaniodon*, they also will be found to present no generic differences from the latter. The number of vertebræ is approximately 50, and, as shown by the sigmoidal curvature of the vertebral axis, the abdominal region is shortened by crushing. The fins, as described and figured by Davis, are exactly those of *Spaniodon*. Allowing, indeed, for the distortion already mentioned, there is no reason why the fish should not be referred to *Spaniodon brevis* *. Possibly the resemblance escaped Davis's observation on account of the extreme distortion of the specimen which he selected to represent the latter species †.

5. *Pantopholis dorsalis*, J. W. Davis, *loc. cit.* p. 600, pl. xxxvi. fig. 2.

The specimen on which this genus and species are founded is still unique, and unfortunately too imperfect to display the essential characters of the fish it represents. The head is distorted and exposed chiefly from beneath, but only a few fragments are distinguishable. It is clear that the postero-lateral portion of the cranium was ornamented with fine radiating lines. Remains of the two opercula show that they were similarly ornamented with very prominent fine ridges radiating backwards from the point of suspension. The mandible must have been slender, about as long as the cranium, and probably destitute of external ornament. Near its symphysial end, but not quite at the extremity, is a relatively large lanciform tooth, laterally compressed, the crown marked by very feeble longitudinal striations, the base slightly expanded and fused with the dentary bone. Remains of three similar but smaller teeth are seen well-spaced further back in the same ramus. Another large laterally-compressed tooth, evidently displaced, is also exposed below the anterior end of the ramus, and there are scattered traces of comparatively small pointed teeth. Beneath the mandible there are indications of about 12 pairs of slender, well-spaced, branchiostegal rays, as already noted by Davis. The vertebral centra

* Pictet & Humbert, *op. cit.* p. 86, pl. xii. figs. 3, 4.
† J. W. Davis, *loc. cit.* p. 592, pl. xxxiv. fig. 1.

seem to have been well ossified, but much constricted, and all those preserved belong to the abdominal region. Nothing can be added to the description of the dorsal scutes given by Davis; but appearances suggest that at the broken hinder end of the fossil the row of scutes terminates, while the dorsal fin begins. The only scales shown are those of the two swallowed fishes in the abdomen.

On the whole, it seems probable that *Pantopholis* will prove to be a member of the same extinct family of Scopeloids as *Enchodus*. It is remarkable for the length and slenderness of the abdominal region, the large size of the pectoral fins, and the unusually numerous median dorsal scutes.

XXXIV.—*Key to the Isopods of the Pacific Coast of North America, with Descriptions of Twenty-two new Species.* By Harriet Richardson.

[Concluded from p. 277.]

IV. ASELLOTA.

Analytical Key to the Families of Asellota.*

a. Lateral parts of cephalon scarcely expanded. Eyes, when present, small, lateral. Peduncle of inferior antennæ without small accessory appendage outside of third joint. Legs ambulatory, except first pair, which are distinctly subcheliform; legs with dactylus generally uniunguiculate. First pair of pleopoda in female very small, not operculiform. Outer lamella of second pair very large and incrusted, so as to form, together with corresponding lamellæ of other side, a sort of operculum, covering the two succeeding pairs	XI. Asellidæ.
a'. Lateral parts of cephalon usually lamellarly expanded. Eyes, when present, usually subdorsal. Peduncle of inferior antennæ generally with small accessory appendage outside of third joint. Legs subequal in length with dactylus, generally bi- or triunguiculate; first pair sometimes prehensile. First pair of pleopoda in female transformed into a single large opercular plate. Outer lamellæ of two succeeding pairs narrow and confluent with basal part	XII. Janiridæ.

* Sars, Crust. of Norway, ii. 1897, pts. 5, 6, pp. 95, 98.